

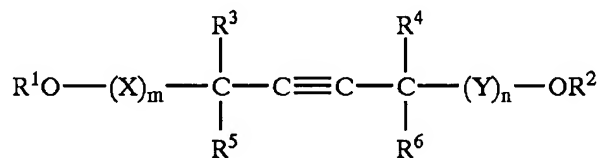
Listing of Claims:

1. (cancelled)

2. (original) A method for polishing a polishing target, wherein the polishing target has an insulation layer, a barrier layer, and a conductor layer; wherein the insulation layer has a surface, which includes a trench; wherein the barrier layer is located on the insulation layer; wherein the conductor layer is made of metal that includes copper and is located on the barrier layer; and wherein each of the barrier layer and the conductor layer has an inner portion located inside the trench and an outer portion located outside the trench, the method comprising:

polishing the polishing target with a first polishing composition to remove part of the outer portion of the conductor layer;

polishing the polishing target with a second polishing composition to remove a remaining part of the outside portion of the conductor layer; wherein the second polishing composition includes abrasive, a polishing accelerator, an organic compound, a corrosion inhibitor, hydrogen peroxide, and water; wherein the abrasive includes at least one of silicon dioxide and aluminum oxide; wherein the polishing accelerator includes at least one of glycine and α -alanine; and wherein the organic compound includes at least one compound selected from the group consisting of polyethylene oxide, polypropylene oxide, polyoxyethylene alkyl ether, polyoxypropylene alkyl ether, polyoxyethylene polyoxypropylene alkyl ether, and an addition polymer of polyoxyalkylene represented by the following chemical formula (1),



wherein each of R^1 to R^6 represents a hydrogen atom or an alkyl group the carbon number of which is any of integer numbers 1 to 10, wherein each of X and Y represents an ethyleneoxy group or a propyleneoxy group, wherein each of m and n represents any of integer numbers 1 to 20, and wherein the corrosion inhibitor includes at least one of benzotriazole and a derivative of benzotriazole; and

polishing the polishing target using a third polishing composition to remove the outer portion of the barrier layer.

3. (original) The method according to claim 2, wherein the first polishing composition includes abrasive, which includes at least one of silicon dioxide and aluminum oxide; a polishing accelerator, which includes at least one of glycine and α -alanine; hydrogen peroxide; and water.

4. (original) The method according to claim 2, wherein the third polishing composition includes abrasive, which includes at least one of silicon dioxide and aluminum oxide; acid or alkali, a corrosion inhibitor, which includes at least one of benzotriazole and a derivative of benzotriazole, and water, wherein the acid includes at least one acid selected from the group consisting of nitric acid, hydrochloric acid, lactic acid, phosphoric acid, sulfuric acid, acetic acid, oxalic acid, citric acid, tartaric acid, malonic acid, succinic acid, maleic acid, and fumaric acid, and wherein the alkali includes at least one alkali selected from the group consisting of potassium hydroxide, ammonium hydroxide, and sodium hydroxide.

5. (currently amended) A method for polishing a polishing target; wherein the polishing target has an insulation layer, a barrier layer, and a conductor layer; wherein the insulation layer has a surface, which includes a trench; wherein the barrier layer is located on the insulation layer; wherein the conductor layer is made of metal that includes copper and is located on the barrier layer; and wherein each of the barrier layer and the conductor layer has an inner portion located inside the trench and an outer portion located outside the trench, the method comprising:

polishing the polishing target using a first polishing composition to remove part of the outer portion of the conductor layer;

polishing the polishing target using a second polishing composition to remove a remaining part of the outer portion of the conductor layer; and

polishing the polishing target using a third polishing composition to remove the outer portion of the barrier layer; wherein the third polishing composition includes abrasive, acid or alkali, a corrosion inhibitor, and water; wherein the abrasive includes at least one of silicon

dioxide and aluminum oxide; wherein the acid includes at least one acid selected from the group consisting of nitric acid, hydrochloric acid, lactic acid, ~~phosphoric acid~~, sulfuric acid, ~~acetic acid~~, ~~citric acid~~, ~~tartaric acid~~, malonic acid, succinic acid, maleic acid, and fumaric acid; wherein the alkali includes ~~at least one alkali selected from the group consisting of potassium hydroxide, ammonium hydroxide, and sodium hydroxide~~; and wherein the corrosion inhibitor includes at least one of benzotriazole and a derivative of benzotriazole.

6. (original) The method according to claim 5, wherein the first polishing composition includes abrasive, which includes at least one of silicon dioxide and aluminum oxide; a polishing accelerator; hydrogen peroxide; and water; and wherein the polishing accelerator includes at least one of glycine and α -alanine.

7. (original) A method for polishing a polishing target, wherein the polishing target has an insulation layer, a barrier layer, and a conductor layer; wherein the insulation layer has a surface, which includes a trench; wherein the barrier layer is located on the insulation layer; wherein the conductor layer is made of metal that includes copper and is located on the barrier layer; and wherein each of the barrier layer and the conductor layer has an inner portion located inside the trench and an outer portion located outside the trench, the method comprising:

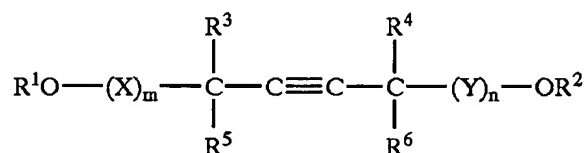
polishing the polishing target using a first polishing composition to remove part of the outer portion of the conductor layer; wherein the first polishing composition includes abrasive, a polishing accelerator, hydrogen peroxide, and water;

polishing the polishing target using a second polishing composition to remove a remaining part of the outer portion of the conductor layer; wherein the second polishing composition includes abrasive, a polishing accelerator, an organic compound, a corrosion inhibitor, hydrogen peroxide, and water; and

polishing the polishing target using a third polishing composition to remove the outer portion of the barrier layer; wherein the third polishing composition includes abrasive, acid or alkali, a corrosion inhibitor, and water;

wherein each abrasive includes at least one of silicon dioxide and aluminum oxide;
wherein each polishing accelerator includes at least one of glycine and α -alanine;

wherein the organic compound includes at least one compound selected from the group consisting of polyethylene oxide, polypropylene oxide, polyoxyethylene alkyl ether, polyoxypropylene alkyl ether, polyoxyethylene polyoxypropylene alkyl ether, and an addition polymer of polyoxyalkylene represented by the following chemical formula (1), and

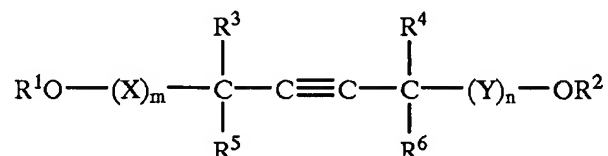


wherein each of R^1 to R^6 represents a hydrogen atom or an alkyl group the carbon number of which is any of integer numbers 1 to 10; wherein each of X and Y represents an ethyleneoxy group or a propyleneoxy group, wherein each of m and n represents any of integer numbers 1 to 20; wherein the acid includes at least one acid selected from the group consisting of nitric acid, hydrochloric acid, lactic acid, phosphoric acid, sulfuric acid, acetic acid, oxalic acid, citric acid, tartaric acid, malonic acid, succinic acid, maleic acid, and fumaric acid; wherein the alkali includes at least one alkali selected from the group consisting of potassium hydroxide, ammonium hydroxide, and sodium hydroxide; and wherein each corrosion inhibitor includes at least one of benzotriazole and a derivative of benzotriazole.

8. (original) The method according to claim 7, wherein the third polishing composition further includes a polishing accelerator, which includes at least one of glycine and α -alanine.

9. (original) The method according to claim 8, wherein a main composition, a first sub-composition, and a second sub-composition are prepared before polishing the polishing target,
wherein the main composition includes abrasive, a polishing accelerator, and water;
wherein the abrasive includes at least one of silicon dioxide and aluminum oxide; wherein the polishing accelerator includes glycine and α -alanine; wherein the first sub-composition includes an organic compound, a first corrosion inhibitor, and water; and wherein the organic compound

includes at least one compound selected from the group consisting of polyethylene oxide, polypropylene oxide, polyoxyethylene alkyl ether, polyoxypropylene alkyl ether, polyoxyethylene polyoxypropylene alkyl ether, and an addition polymer of polyoxyalkylene represented by the following chemical formula (1),



wherein each of R¹ to R⁶ represents a hydrogen atom or an alkyl group the carbon number of which is any of integer numbers 1 to 10; wherein each of X and Y represents an ethyleneoxy group or a propyleneoxy group; wherein each of m and n represents any of integer numbers 1 to 20; wherein the first corrosion inhibitor includes at least one of benzotriazole and a derivative of benzotriazole; wherein the second sub-composition includes acid or alkali, a second corrosion inhibitor, and water; wherein the acid includes at least one acid selected from the group consisting of nitric acid, hydrochloric acid, lactic acid, phosphoric acid, sulfuric acid, acetic acid, oxalic acid, citric acid, tartaric acid, malonic acid, succinic acid, maleic acid, and fumaric acid; wherein the alkali includes at least one alkali selected from the group consisting of potassium hydroxide, ammonium hydroxide, and sodium hydroxide; and wherein the second corrosion inhibitor includes at least one of benzotriazole and a derivative of benzotriazole; and

wherein the first polishing composition is prepared by mixing the main composition and hydrogen peroxide when using the first polishing composition; wherein the second polishing composition is prepared by mixing the main composition, the first sub-composition, and hydrogen peroxide when using the second polishing composition; and wherein the third polishing composition is prepared by mixing the main composition and the second sub-composition when using the third polishing composition.

10. (original) The method according to claim 7, wherein the third polishing composition further includes hydrogen peroxide.

Appl. No. 10/642,929
Amdt. dated June 19, 2006
Reply to Office Action of February 9, 2006

11-24 (cancelled).


PLEASE ADD NEW CLAIM 25:

25. (New) The method according to claim 5, wherein the third polishing composition includes nitric acid or lactic acid as the acid or alkali.

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In view of the forgoing, Applicant respectfully submits that all of the pending claims are in condition for allowance. The Examiner is respectfully requested to promptly issue a Notice of Allowance. If there are any remaining issues that require clarification, the Examiner is respectfully requested to contact the undersigned.

Respectfully submitted,


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